

In re Patent Application of:
PELLAT ET AL.
Serial No. 10/718,493
Filing Date: NOVEMBER 20, 2003

REMARKS

Applicants would like to thank the Examiner for the thorough examination of the present application. Page 4 in the specification has been amended to correct a noted error. The arguments supporting patentability of the claims are provided below.

I. The Claims

The Examiner rejected independent Claims 15, 22, 28 and 39 over the Khorram patent. The present invention, as recited in independent device Claim 28, for example, is directed to a frequency transposition device comprising a local oscillator providing a local oscillator signal, and a current switching circuit comprising two differential pairs of transistors controlled by the local oscillator signal. Each transistor comprises a control terminal.

A calibration loop calibrates the two differential pairs of transistors in succession by setting a voltage difference applied to the control terminals of one of the pairs of transistors undergoing calibration until an output voltage of the frequency transposition device is set to zero to within a predetermined accuracy.

The frequency transposition device further comprises a storage circuit for storing the voltage differences applied to the control terminals of the two differential pairs of transistors after calibration, and a control circuit for operating the calibration loop in either a calibration mode or a normal mode.

The control circuit is operated by inactivating the local oscillator in the calibration mode for calibrating in

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succession the two differential pairs of transistors by setting to zero a reference path current of one of the pairs of transistors not undergoing calibration while setting the voltage difference, and activating the local oscillator in the normal mode and applying the stored voltage differences to the respective control terminals of the two differential pairs of transistors.

Independent device Claim 39 is similar to independent device Claim 28, but is directed to a cellular mobile telephone comprising a radio frequency stage comprising at least one mixer as defined in Claim 28.

Independent method Claim 15 is directed to a process for reducing second-order nonlinearity of a frequency transposition device as defined in independent device Claim 28. Independent method Claim 22 is directed to a process for operating a cellular mobile telephone as defined in independent device Claim 39.

II. The Claims Are Patentable

The Khorram patent is directed to a programmable mixer. The Examiner referenced FIG. 3 in the Khorram patent as illustrating programmable mixers 100 and 102, and referenced FIGS. 5 and 6 as illustrating in greater detail one of the mixers. The current switching circuit in FIG. 6 comprises two differential pairs of transistors 152-154 and 162-164 controlled by a local oscillator signal LO.

The Examiner also characterized the compensation module 134 as performing the same function as the calibration loop in the claimed invention. Column 13, lines 54-58 in the Khorram patent discloses a memory for storing various circuit

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values; and column 12, line 65 - column 13, line 1 discloses the local oscillator operating in a calibration mode.

The Examiner further characterizes column 13, lines 11-17 as disclosing activation of the local oscillator in a normal mode for deactivating the calibration loop, and applying the stored voltage differences to the respective control terminals of the two differential pairs of transistors 152-154 and 162-164.

In the claimed invention, the calibration loop for calibrating the two differential pairs of transistors in succession is performed by setting a voltage difference applied to the control terminals of one of the pairs of transistors undergoing calibration until an output voltage of the frequency transposition device is set to zero to within a predetermined accuracy.

In contrast, reference is directed to column 3, line 60 through column 4, line 2 in the Khorram patent, which provides:

"According to one aspect of the present invention, the programmable mixer is present in the transmit portion of an RF receiver. With this RF transceiver, a state of the programmable mixer is set during a calibration phase to minimize local oscillator feedthrough. During this calibration phase, inputs to the programmable mixer are set to zero, or to a known state and the local oscillator is set to a calibration frequency. Then one of known calibration states of the programmable mixer is entered ad the local oscillator feedthrough is measured."
(Emphasis added)."

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The Applicants submit that the Examiner has mischaracterized the Khorram patent. No reference is made in the Khorram patent that during calibration of the two differential pairs of transistors an output voltage of the mixer is set to zero to within a predetermined accuracy based upon setting a voltage difference applied to the control terminals of one of the pairs of transistors undergoing calibration. Instead, the inputs to the programmable mixer in the Khorram patent are set to zero or a known state. Then, one of a plurality of known calibration states of the programmable mixer is entered and the local oscillator feedthrough is measured.

Accordingly, it is submitted that independent Claim 28 is patentable over the Khorram patent. Independent Claims 15, 22 and 39 are similar to independent Claim 28. Therefore, it is submitted that these claims are also patentable over the Khorram patent.

In view of the patentability of independent Claims 15, 22, 28 and 39, it is submitted that the dependent claims, which include yet further distinguishing features of the invention are also patentable. These dependent claims need no further discussion herein.

III. CONCLUSION

In view of the arguments provided herein, it is submitted that all the claims are patentable. Accordingly, a Notice of Allowance is requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

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Respectfully submitted,


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